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PROPOSED PROGRAM FOR  
HR-73 CONFIGURATION  
1 Oct. '58-31 Dec. '58

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## INTRODUCTION

This report describes the objective and general plan of the three-month program of work on the ER-73C Configuration. Where specific work items are known, they are discussed, and other work items are mentioned briefly. Finally, a schedule is presented for those items which are now well defined.

A parallel effort to obtain special isolation mounts seems desirable, and this is discussed in the appendix.

### OBJECTIVE AND GENERAL PLAN

The objective of the forthcoming work on the HR-73C Configuration is to improve reliability of the system.

To accomplish this objective, the following general plan is proposed: Evaluation of component failures and system operation; modification of components as required, where feasible; initiate modification of components as required, if impossible to complete modification; and flight testing of configuration, after ground tests prove that the modifications are satisfactory.

Upon completion of this work, the next objective is to further improve quality.

A red-dot series is planned, and should be carried out immediately after the successful conclusion of the configuration's flight testing.

### **SPECIFIC WORK PLANS**

The unreliability of the shutter is obvious. This will be redesigned, and, since the contemplated modifications are simple, the shutter will be modified and ground tested as part of this program.

Similarly, there are obvious problems in maintaining focus. Temperature control of the refracting lenses, temperature characteristics of the entire configuration, platen shape conformity to the focal curve, and vacuum effectiveness must all be analyzed. Where corrective action is indicated, it will be undertaken.

Also, there is evidence of considerable image motion on all the recent material. The image motion compensation (IMC), stabilization, mechanical balance (static and dynamic), and positioning must all be analyzed. Adjustment of the scanning mechanism's center of gravity and shimming the electrical rack are clearly indicated to improve mechanical balance, and these two items will be undertaken. Another area of effort is well defined: a system analysis of the configuration and related equipment is clearly required; and this necessitates that all electrical schematics be revised to show the present circuitry. The specific corrective action to reduce image motion is not yet defined, but it will be undertaken when ascertained.

Some image doubling has occurred recently. Although this might be due to the roughness of the shutter, the possibility exists that the material is slipping on the platen due to imperfect vacuum or that the scanning mirror is too far from its supporting frame. This will be investigated, and corrective action undertaken.

Various other small problems will be cleaned up where the effort will not detract from the above described work areas: twelve six-inch core material spools will be fabricated, since these will permit a more flexible (and, therefore, efficient) spooling schedule; various items which are needed (telescope,

1 meters, test equipment, etc.) will be acquired since the present arrangement of improvising and/or borrowing such items is inefficient and time consuming; the data recorder will be properly focused; and maintenance and pre and post flight check lists will be devised.

**ADDITIONAL WORK ITEMS**

Certain items of work are now apparent: some electrolytic capacitors should be replaced; the oblique brake mechanism should be removed; the cager sockets should be replaced with lighter ones; travel limits should be installed in the Hand Control Memory Unit; an acoustic test should be run at the frequencies observed in the article's Q-bay; all electrical connectors should be numbered; unused heaters should be removed; an extra film drive servo, oblique drive servo, and position servo should be modified to provide adequate support; mis-metering of the material occurs during mode changes and this should be corrected; the scanning mechanism has a drift-limit in the electromechanical servo which should be removed; the oblique meter should be covered; the levels should have a warning label; all the adjusting screws should be sealed; and the paint should be touched up.

At the conclusion of the test flights, test flight instrumentation must be removed. Similarly, prior to the red dot tests, the ability of the configuration to simultaneously transport thick and thin material must be ascertained.

As work is needed to fill small time periods, these items will be undertaken.

#### **SCHEDULE**

The planned schedule calls for evaluation and repair in October, flight test in November, and red dot tests in December. However, flight tests will not commence until all modifications are thoroughly acceptable, nor will the red dot tests commence until the flight tests are concluded. Therefore, any delay would set back the entire program.

## APPENDIX: SYSTEM ISOLATION

Since motions of the C System degrade resolution, some gain in performance can be expected by the utilization of a properly designed isolation system. The Vibration Consultants have recommended and proposed such a system. The only way to ascertain the gain such an isolation system offers is to install it and conduct tests. This is recommended.

The isolation system could be delivered by the Vibration Consultants in 10-12 weeks, and would be available after this three month program's conclusion, so it is proposed that the procurement of the isolation system be accomplished as a parallel (but separate) program.

Viewing the overall program on the HR-73C Configuration, this parallel effort should logically be instituted now: Evaluation led to modifications; modifications brought a substantial quality improvement; the quality improvement revealed reliability problems; the reliability problems are now being investigated so that solutions can be applied; and the next step should be two-fold — determination of the using command's problems and further quality improvement. Further quality improvement requires that an isolation system be available for test, so the anticipation of this next phase indicates that the isolation system should be ordered immediately so as to be available.